

Remarks/Arguments

Claims 1, 3, 13, 30, 31, and 32 have been amended. Claim 2 has been cancelled. Claims 31-33 have been renumbered as claims 30-32 per the Examiner's directive. The application as presently claimed contains patentable subject matter, and allowance is respectfully requested.

Applicant's Invention

Applicant's invention is directed to a purification device including a detachable and discrete cylindrical capsule column module which can be pre-packed with wet, hydrated chromatographic media (or be supplied empty for the end-user to pack with chromatographic media) for purification of proteins. A diverse selection of chromatographic media can be exploited in these column modules, thereby creating kits bundled with buffers and sample preparation tools that provide the total purification solution to the end-user. The columns can be inserted into the sample chambers through a compression fit. The detachability of the column modules enables the very same column modules to be re-used. The column modules are capsules, and as such are capped at both ends so that the media is preserved with an extended life span and shipped *in situ*. The capsule is an innovative feature which allows wet chromatography media to be stored in the column module without deterioration in performance.

A sample chamber (i.e., reservoir) resides above the cylindrical capsule column module, and a lower tapered part of the sample column module holder houses the cylindrical capsule and is intended to enhance the separation power of the column in a centrifuge. The purification device operates under low pressure separation processes. The detachable cylindrical capsules contain a microporous flow regulator that regulates the flow rate of the sample through the column module. Increasing the residence time through the chromatographic media in the column module increases significantly the binding capacity of the column. The slowest speed generated by a centrifuge, for example, is typically too fast for the binding kinetics of many porous media.

The invention is relevant to single array or multiple array formats where multiple samples can be processed in parallel.

The Cited Prior Art

U.S. Patent No. 5,918,273 (Horn)

The Horn Patent is directed to a cassette assembly for loading samples for use in applications of high performance liquid chromatography (HPLC), an analytical method which requires high pressure conditions where small liquid samples are atomized and passed through a column. It is comprised of mini-columns which possess required concave ends, and sample loading funnels included therein for loading and providing a specimen for analysis by HPLC. The concave ends of the mini-columns create an interface which permits direct insertion of the mini-column into a high pressure solvent line suitable for performing HPLC.

U.S. Patent No. 6,103,195 (Shukla)

The Shukla patent is directed to the use of spin columns for a centrifuge using a conventional luer lock configuration to prepare and purify a variety of compositions. More than one spin column is required, and the spin columns spaced above and below each other. Filtration and a chromatographic procedures are performed in a two-part process by the different columns.

U.S. Patent No. 5,603,899 (Franciskovich)

The Franciskovich patent is directed to a multiple column chromatography assembly including a manifold with a plurality of support tubes and a plurality of separation columns placed in the support tubes.

Rejections Under 35 U.S.C. §112

Reconsideration is requested of the rejection of claim 34 as not being properly described in the specification. Enablement is determined from the viewpoint of a person of skill in the field of the invention at the time the patent application was filed. "The law is clear that patent documents need not include subject matter that is known in the field of the invention and is in the prior art, for patents are written for persons experienced in the field of the invention." *S3 Inc. v. NVIDIA Corp.*, 259 F.3d 1364 (Fed. Cir. 2001), citing *Vivid Technologies, Inc. v. American Science and Engineering, Inc.* 200 F.3d 795, 804 (Fed. Cir 1999). While applicants did not disclose how to make the tool, or provide a description of the tool's structure, such disclosure is not required under 35 U.S.C. §112. A person of skill in the art would be familiar with the structure and how to use such a tool in the claimed application. The rejection of claim 17 is moot by applicant's cancellation of claim 17.

Rejections Under 35 U.S.C. §102

Anticipation under 35 U.S.C. §102 requires each and every limitation of the claim to be disclosed in a single prior art reference, either expressly or inherently. The anticipating reference must disclose the elements in the arrangement called for by the claim. If any limitation of the claim is missing, the reference does not anticipate.

Reconsideration is requested of the rejection of claims 1-5, 7, 10-11, 13, 17-18 as anticipated by Horn. Horn fails to disclose a “discreet column insert module comprising a cylindrical capsule extending from an opening of the sample chamber.” A cylinder is a shape defined by, “a surface generated by a straight line moving parallel to a fixed straight line and intersecting a plane curve.” See *Webster’s II New Collegiate Dictionary*, 1995. The surface of the presently claimed column insert module is cylindrical, and is therefore a straight line extending from the opening of a sample chamber.

Horn’s mini-column, in contrast, is required to have concave tapered ends, and is not cylindrical. Horn does not disclose a cylindrical capsule as presently claimed, but rather discloses “a generally concave, preferably tapered opening at each end of the column.” See column 5, lines 15-17 of Horn. The ends are tapered, or as Horn teaches, concave, to ensure zero dead volume and a suitable high pressure seal with a compression fit to a conical tip nozzle.

Further, the mini-column of Horn is not a capsule. The invention of Horn is restricted to mini columns that are not capped. The presently claimed column insert module is a cylindrical capsule, and thus is capped at its ends and is used for packing both soft and hard resin slurries in a hydrated and wet state. There is no such cylindrical capsule in the Horn patent.

Furthermore, the assembly of Horn requires a non-cylindrical construction including concave ends in order to function properly. Horn clearly states in column 5, lines 10-19, that “unlike the mini-columns of the prior art, both terminal ends of the mini-columns of this invention are designed to accommodate the extremely high pressures (greater than 1200 psi) needed to perform reverse-phase HPLC of the immobilized proteins or other hydrophobic moieties. This is accomplished by designing a generally concave, preferably tapered opening at each end of the

column so that an interface means may be attached thereto with near-zero dead volume.” The mini-columns are used for extremely high pressure needed to perform reverse phase HPLC. The present invention relates to low pressure applications, such as centrifugal and chromatographic operations not related to high performance liquid chromatography (HPLC) and does have tapered ends.

Each of the independent claims include a, “discreet column insert module comprising a cylindrical capsule extending from an opening of the sample chamber” as defined in claim 1, and each independent claim and claims dependent therefrom are not anticipated for the same reasons.

Rejections Under 35 U.S.C. §103

Reconsideration is requested of the rejection of claims 6-9, 12, 14-16, and 31-34 as defining subject matter that would have been obvious in view of Horn combined with U.S. Patent No. 6,103,195 to Shukla for claims 6-9; and U.S. Patent No. 5,603,899 to Franciskovich for claims 14-16 and 31-34. Each of these claims contains the “discreet column insert module comprising a cylindrical capsule extending from an opening of the sample chamber and configured to contain a separation bed,” which is neither disclosed nor suggested in Horn. Neither Shukla nor Franciskovich disclose such a cylindrical capsule, and the combination of the references therefore fail to render the present invention obvious under 35 U.S.C. § 103.

Still further, Horn expressly teaches away from such an embodiment, as the concave tapered endings of Horn are required to establish high pressure with near-zero dead volume. See Horn, column 5, lines 10-19, cited above. None of the references cited by the Examiner disclose or suggest a module comprising a cylindrical capsule as presently claimed, and therefore they do not cure the deficiencies of Horn.

The application is considered to be in condition for allowance and such action is solicited.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Mark E. Baron', with a long horizontal flourish extending to the right.

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